

Committee Workshop on Proposed Forecast of 2007 Peak Demand

Staff Presentation
June 5, 2006



Background

- Staff Electricity and Natural Gas Demand Forecasts
 - Sept. 2005 *CED 2006-2016 Staff Energy Demand Forecast and Energy Demand Forecast Methods Report*
 - Based on 2004 actual loads
- Revised forecast is needed to support CPUC 2007 Resource Adequacy Process:
 - The CEC forecast is the control total for the aggregated CPUC-jurisdictional LSE forecasts.
 - CEC must provide LSEs their adjusted year ahead forecast by June 30th for Sept. showing.
- This forecast may also be used by CA ISO
- Following the workshop, forecast may be revised. Comments are requested by June 9th.



Staff 2007 Peak Forecast Methods

- Used 2005 hourly recorded loads and temperature to estimate weather normalized peak
- Applied service or planning area growth rates from previous forecast to project 2007 peak demand.



Summary of Results

- 2005 loads higher than projected
- Driven by growth in residential peak?

Caveats:

- Weather adjusted peaks are inferences – uncertainty remains.
- Forecast does not attempt to account for recent changes (rate increases, econ. trends)



Revised 2007 vs. CED 2006 Peak Demand Forecast (MW)

		2005	2007	Annual Growth Rate
PG&E Service Area	Sept. 2005	18,311	18,914	1.6%
	Revised	19,272	19,905	1.6%
	Change	961	991	
SCE Planning Area	Sept. 2005	21,510	22,163	1.5%
	Revised	22,442	23,124	1.5%
	Change	932	960	
SDG&E	Sept. 2005	4,231	4,371	1.6%
	Revised	4,307	4,450	1.6%
	Change	76	79	



Weather Normalization Methodology

- Used hourly load data and daily temperature data to estimate relationship between summer afternoon weekday peak and temperature

Predicted MW =

$$a + b * (\text{Daily Max. Temp.}) + c * (\text{Temp. Spread})$$

- Load data is preliminary FERC Form 714 data
- Temperature data is from National Weather Service (NWS) sites for PG&E and SCE. For SDG&E weather data is a combination of NWS data and data provided by SDG&E



Weather Variable Definitions

- 3-day weighted maximum temperature (Max631)
 - Used to account for heat build-up
 - $\text{Max631} = .6 * (\text{max current day}) + .3 * (\text{max day-1}) + .1 * (\text{max day-2})$

Utility	Station/Weight				
PG&E	Ukiah	Sacramento	Fresno	San Jose	San Francisco
	0.072	0.144	0.422	0.325	0.037
SCE	Fresno	Long Beach	Burbank	Riverside	
	0.062	0.324	0.243	0.371	
SDG&E	Lindbergh Field	Mirimar	El Cajon		
	0.333	0.333	0.333		

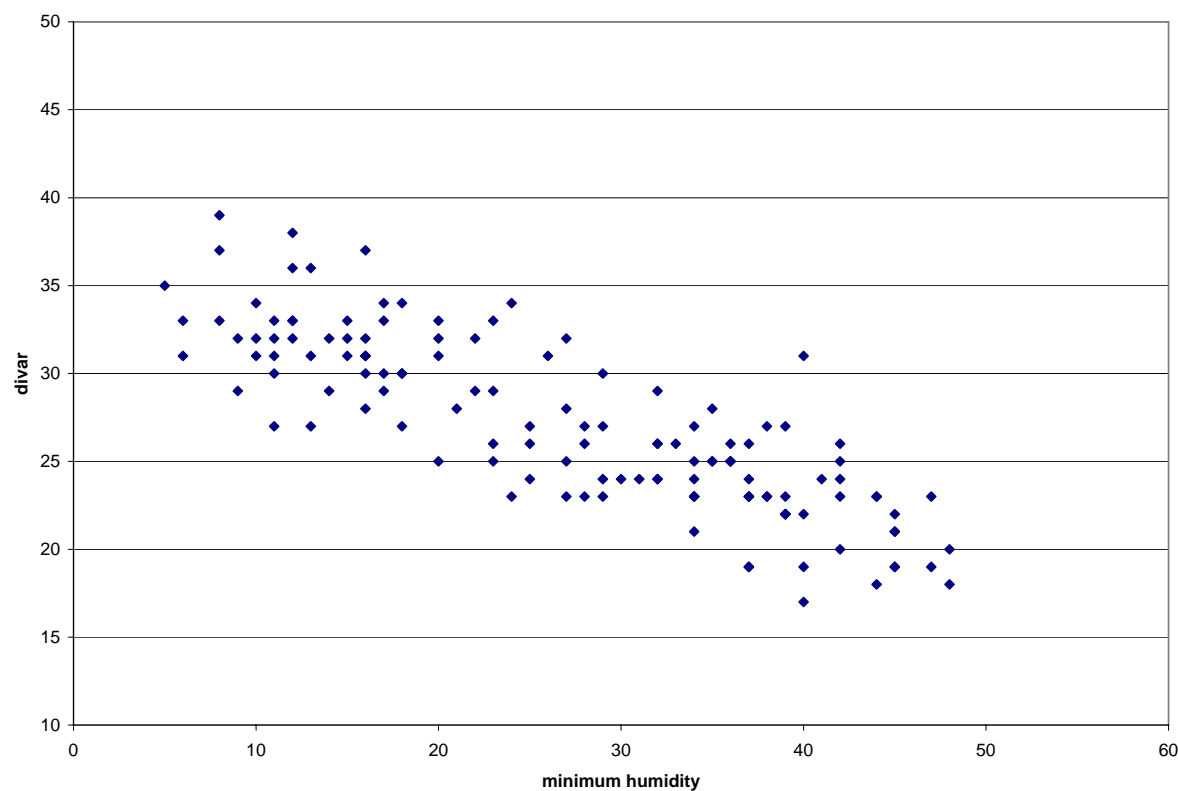


Weather Variable Definitions

- Daily temperature spread or diurnal variation (Divar)
 - Used as a proxy for humidity
 - For a given maximum temperature the lower the temperature spread the higher the humidity
 - $\text{Divar} = \text{daily maximum temperature} - \text{daily minimum temperature}$
 - Divar is not lagged because it is meant to capture the actual operating characteristics of a/c units (energy used to remove water from air).



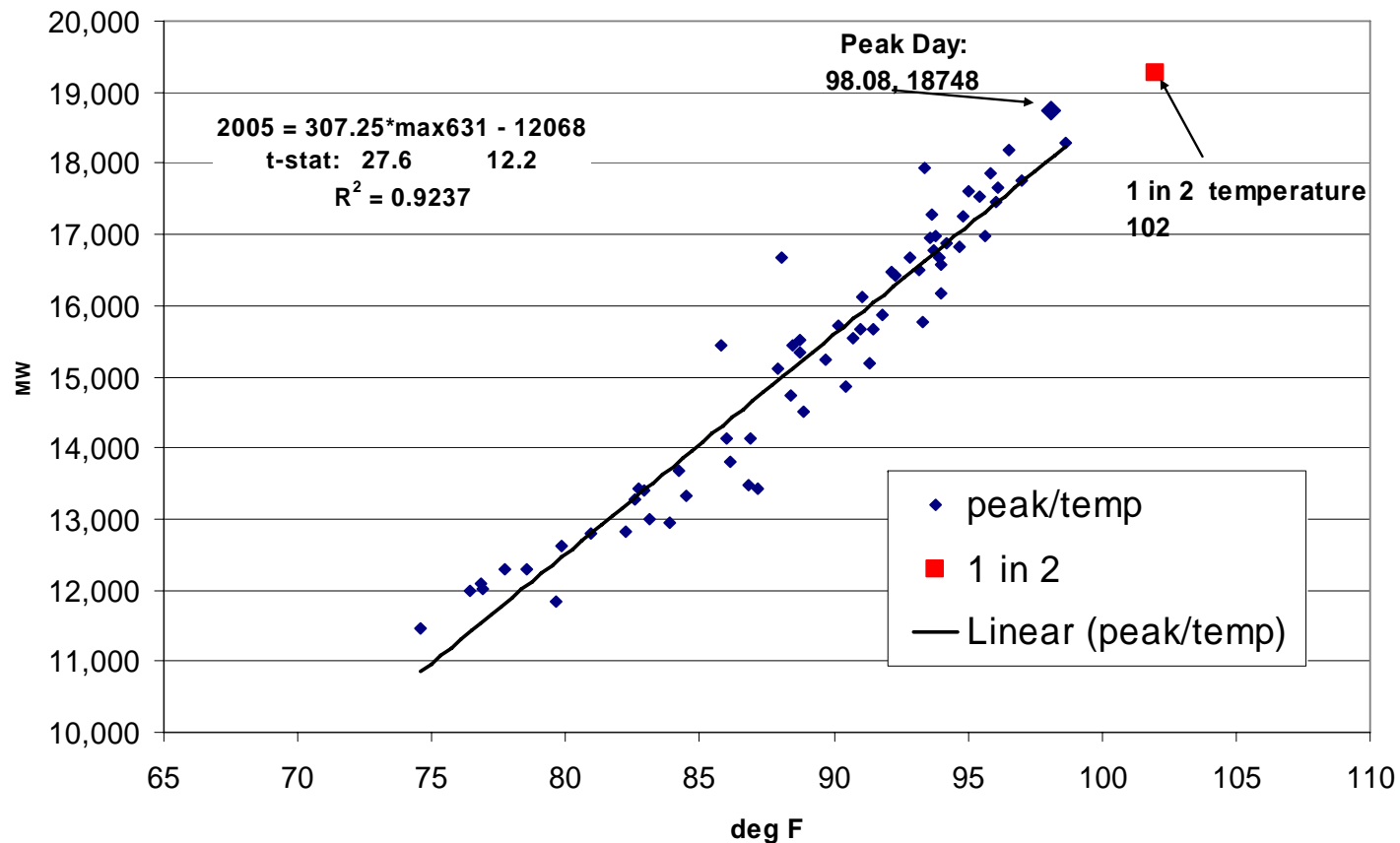
Daily Minimum Humidity vs. Diurnal Variation (2005 Burbank above 80 Degrees F)



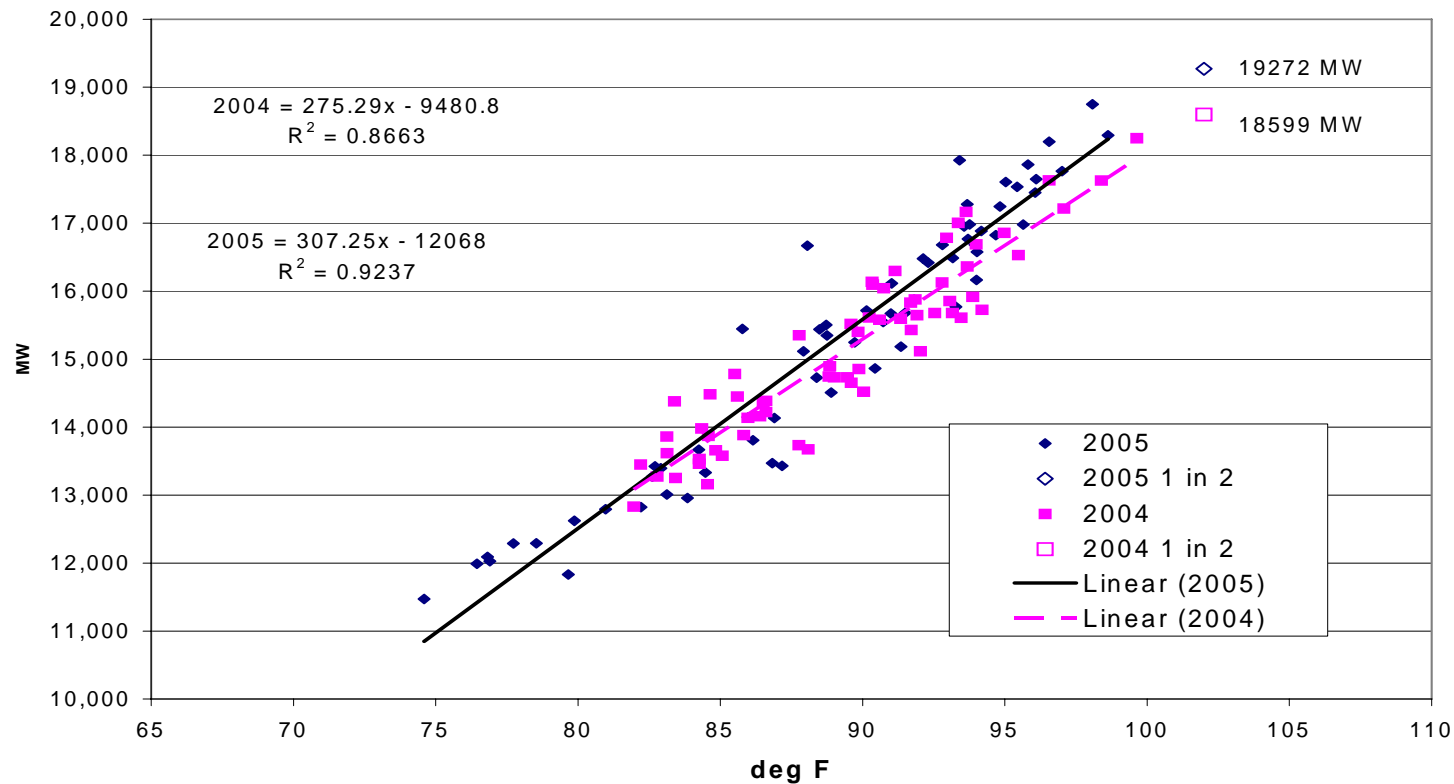
PG&E Results



PG&E 2005 Summer Weekday Peaks vs. Temperature



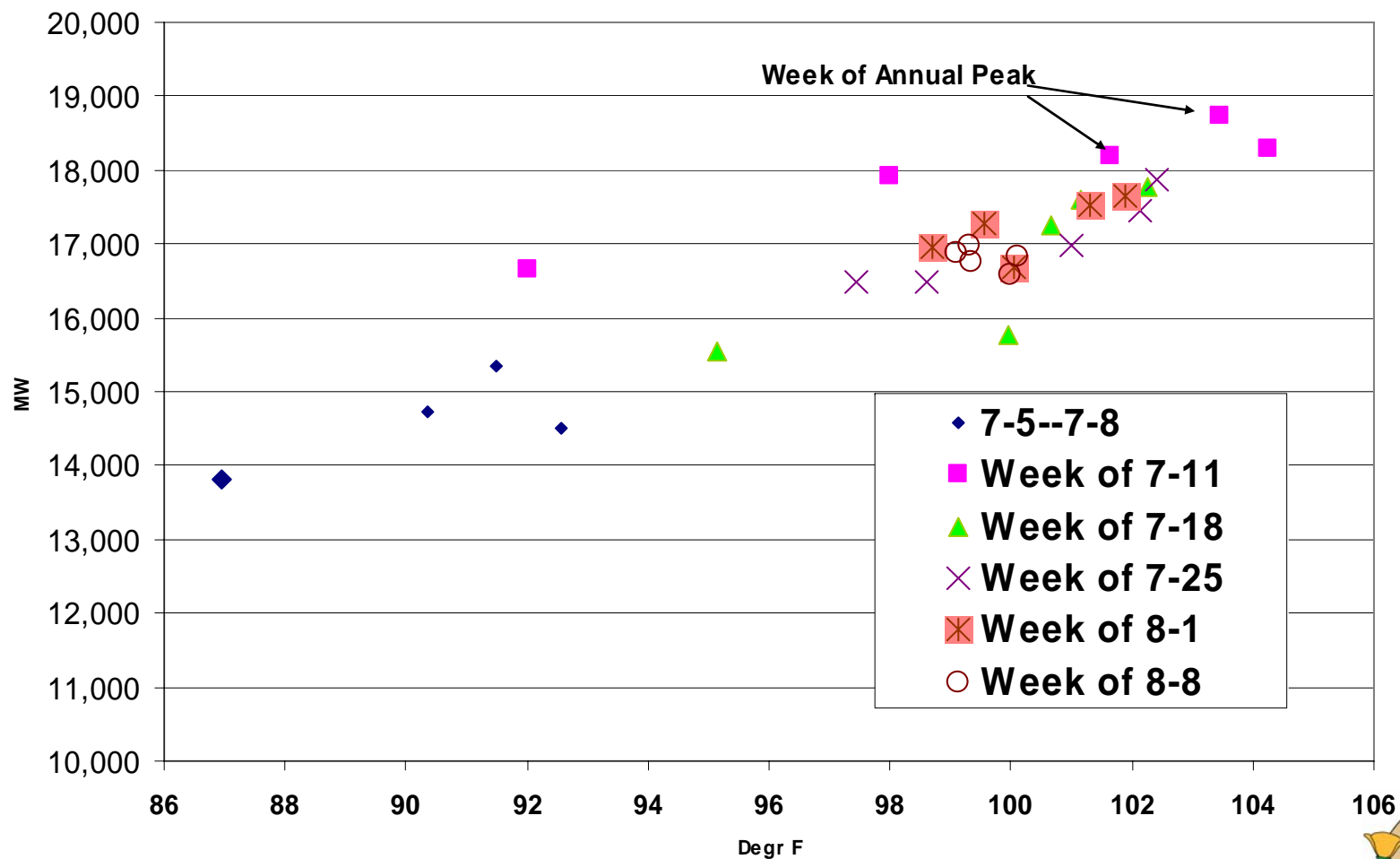
PG&E 2004 – 2005 Summer Weekday Temperature – Peak Comparison



•2004/2005 weather adjusted peak load growth =3.6%

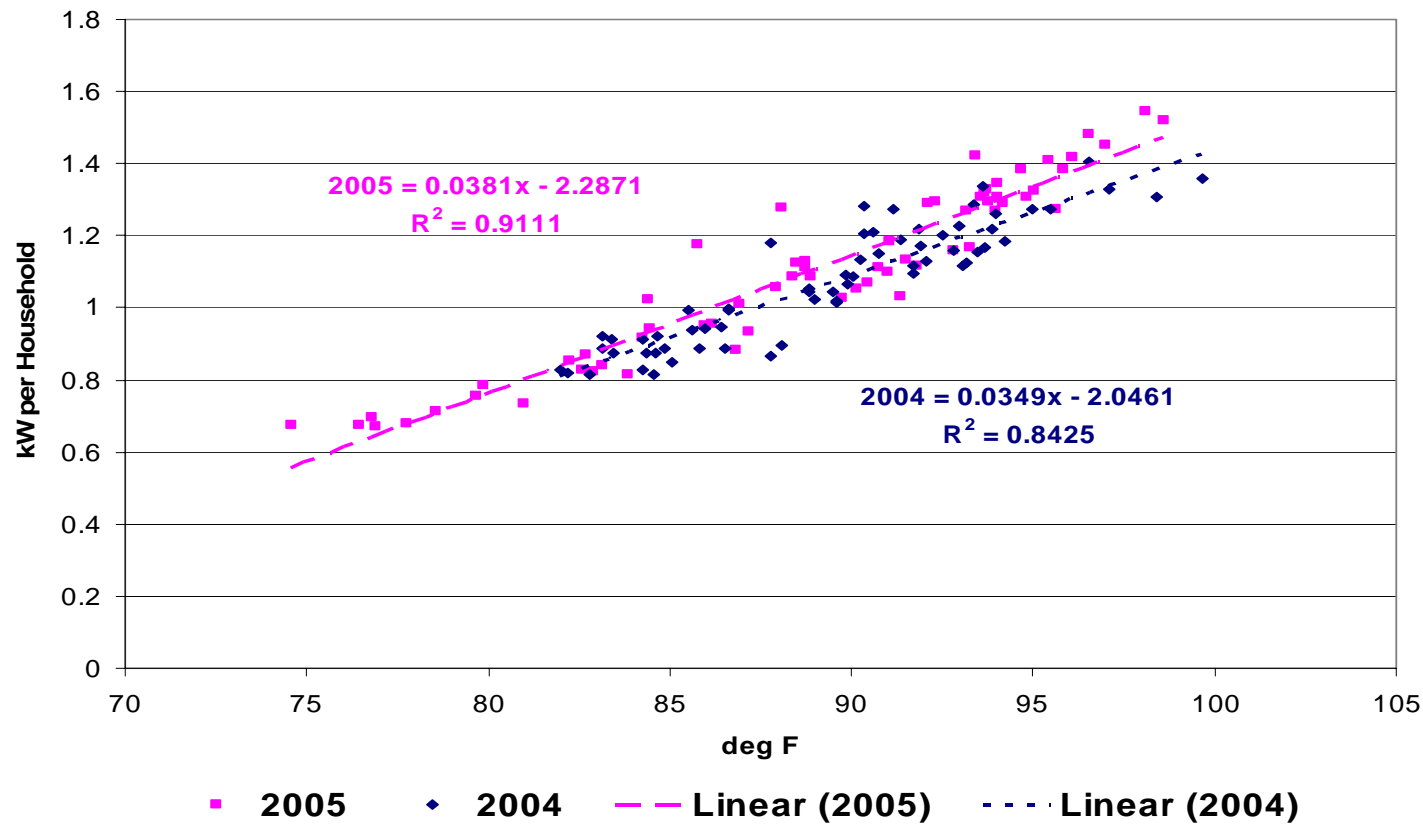


PG&E 2005 Temperature – Peak by Week



PG&E Residential Coincident Peak Demand v. Temperature

(PG&E Dynamic Load Profile Data, Rate E-1, Hour 16)

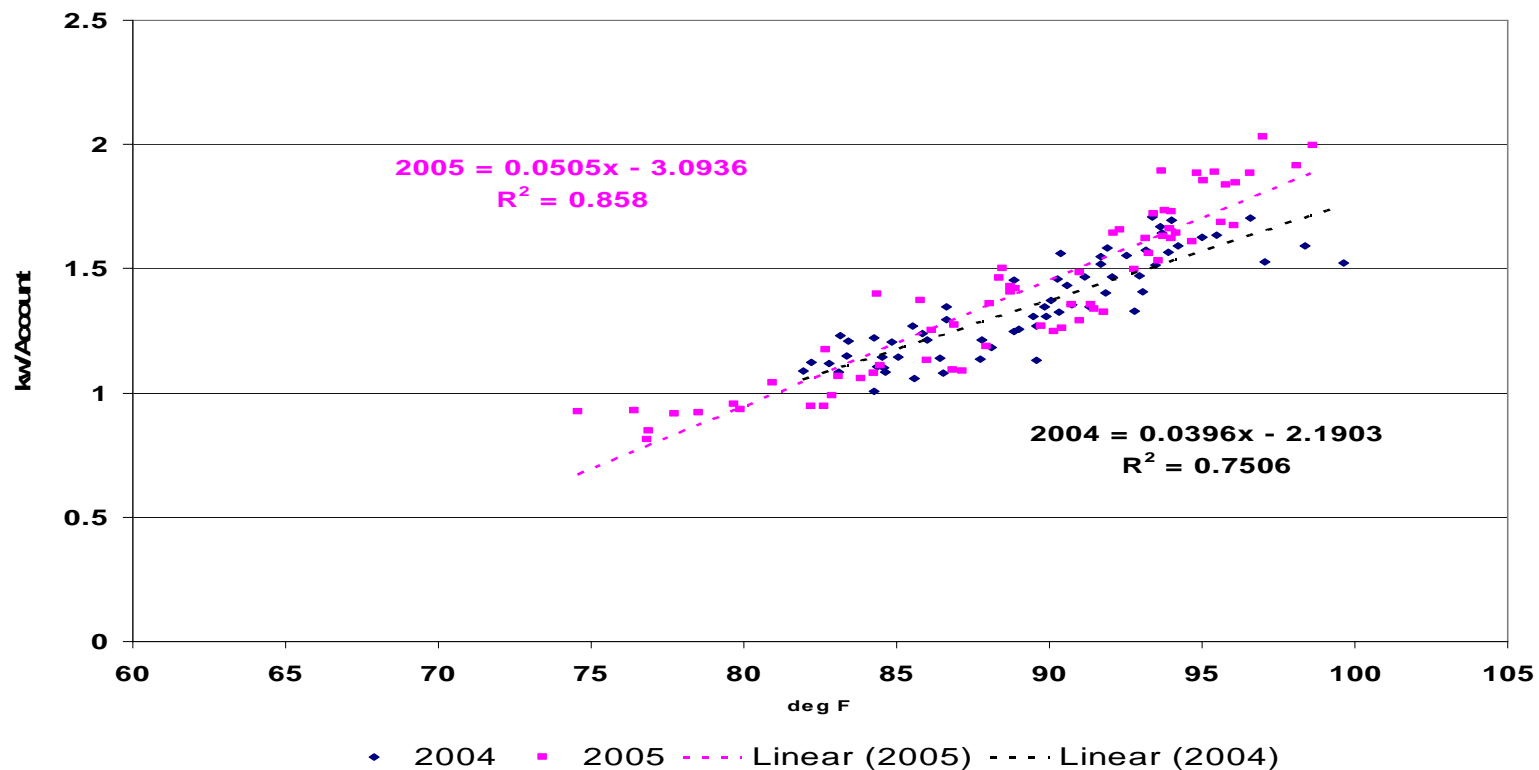


In 2005, residential loads exhibit an increase similar to the system results



PG&E Residential TOU Coincident Peak v. Temp.

(PG&E Dynamic Load Profile Data, Rate E-7, Hour 16)



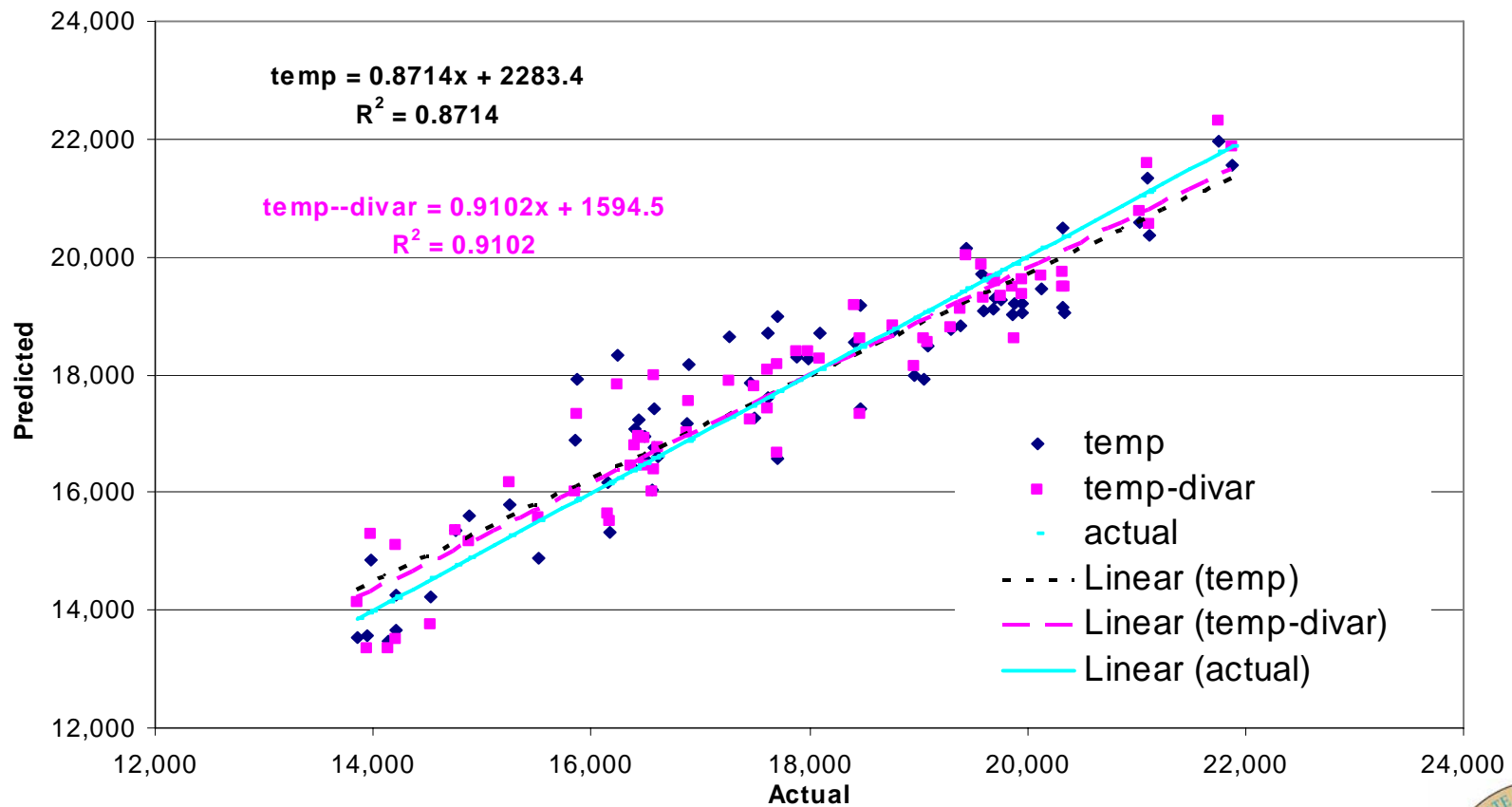
15 In contrast to 2004, TOU Customers increased demand at the peak hours.



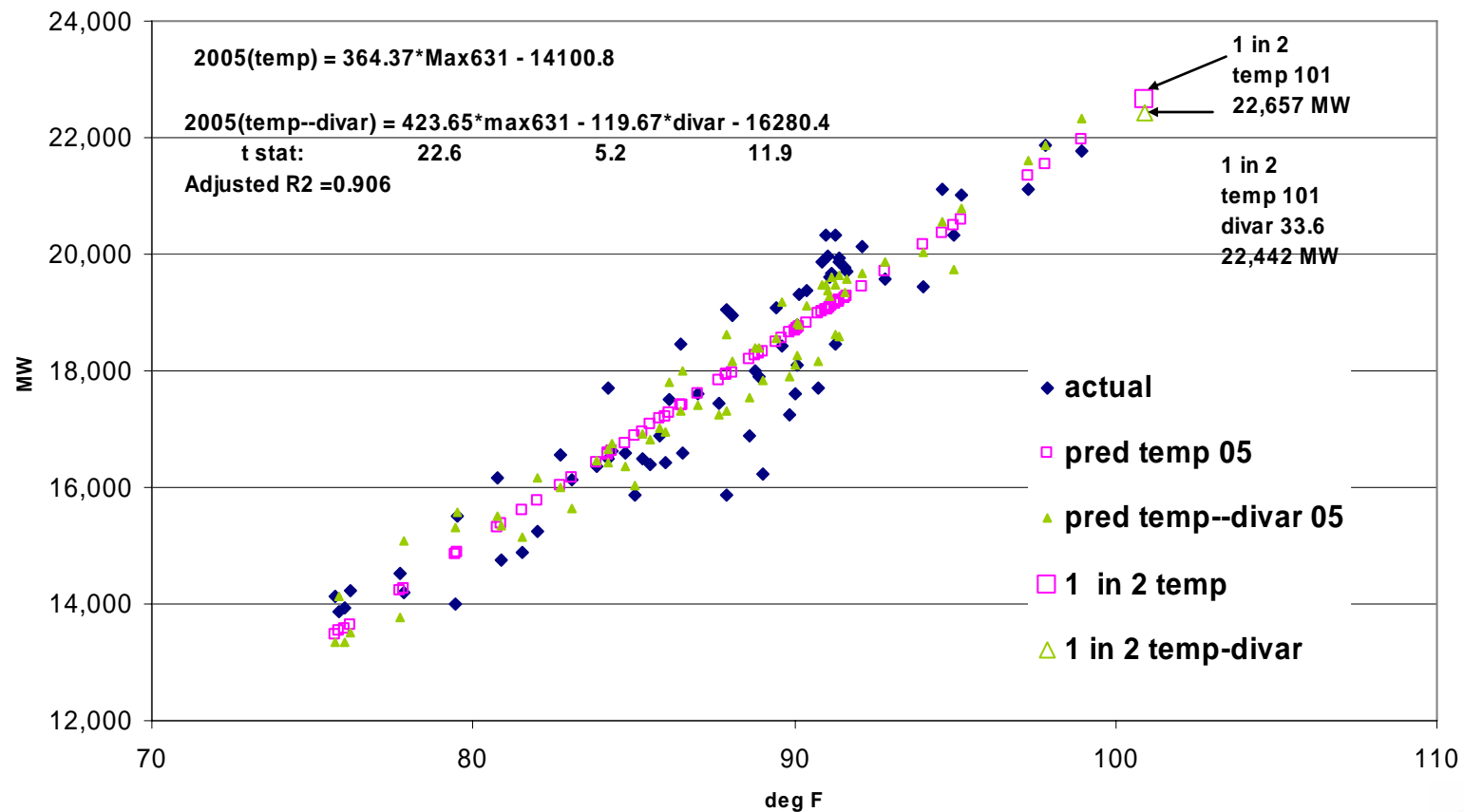
SCE Results



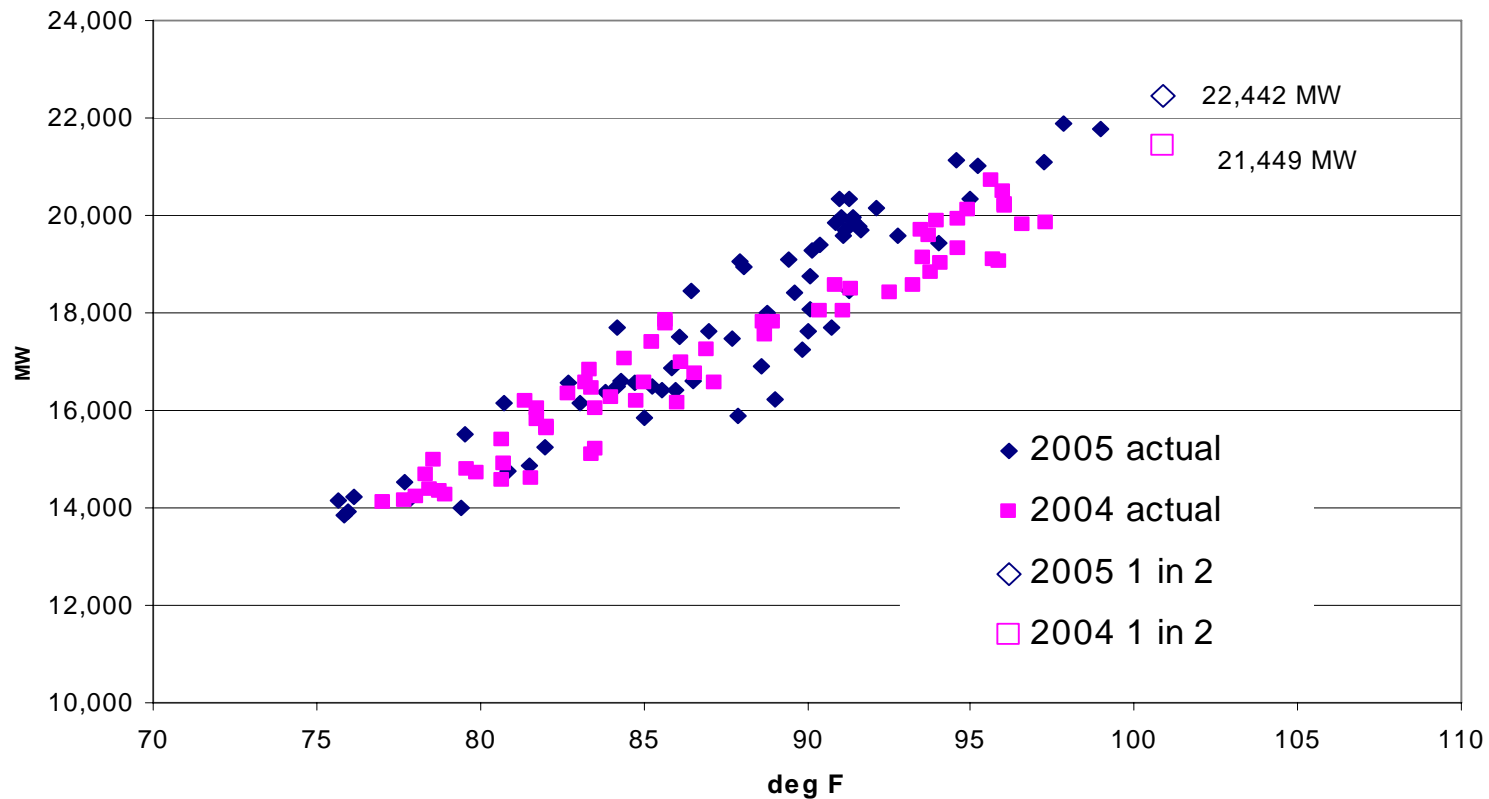
Predicted 2005 SCE Summer Weekday Peaks Using Temperature and Temperature w/diurnal variation



SCE 2005 Model Results using Alternative Weather Variables



SCE 2004 – 2005 Summer Weekday Temperature – Peak Comparison



2004/2005 weather adjusted peak load growth =4.6%

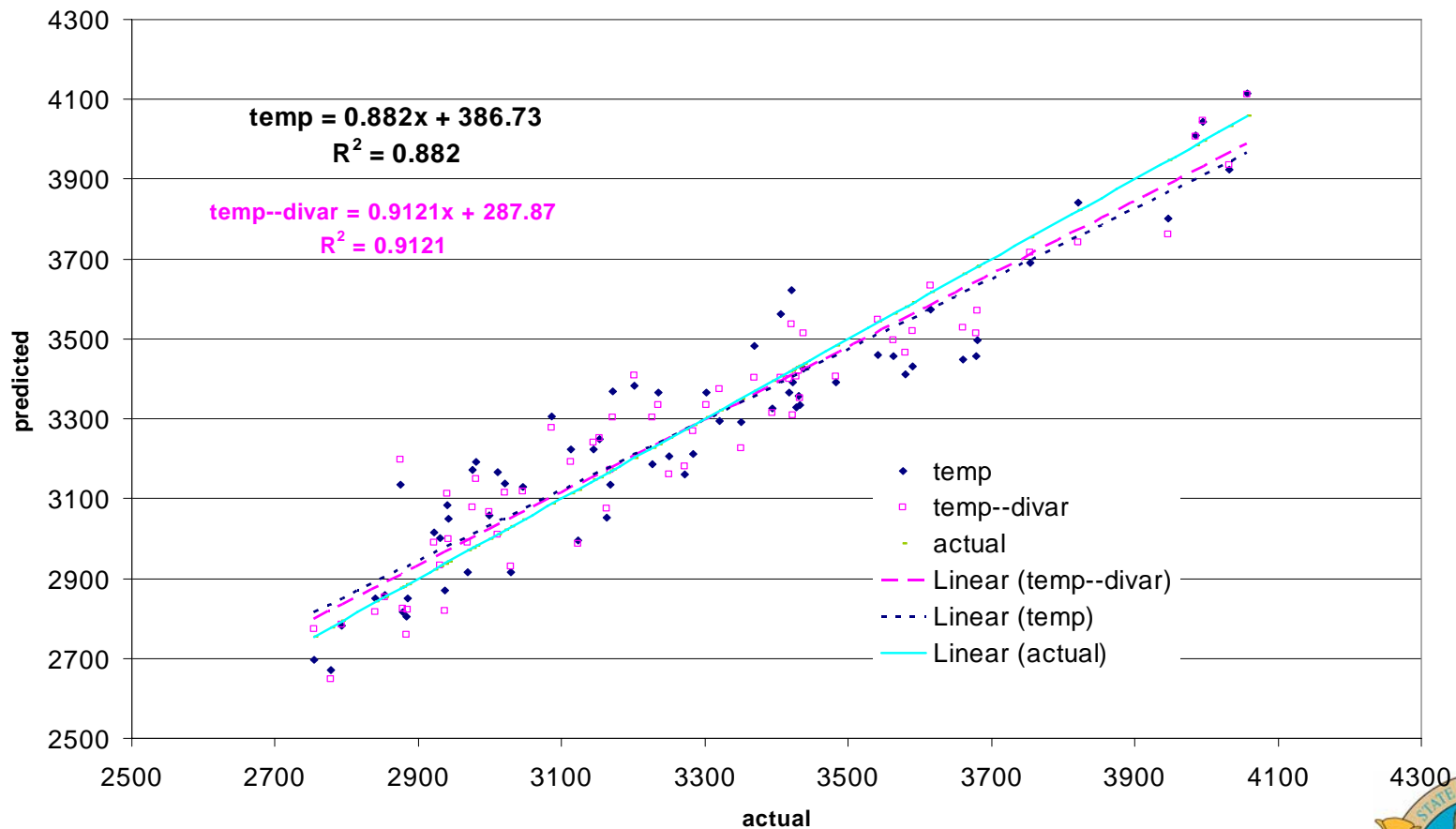
Note: Model results include diurnal variations for a given temperature



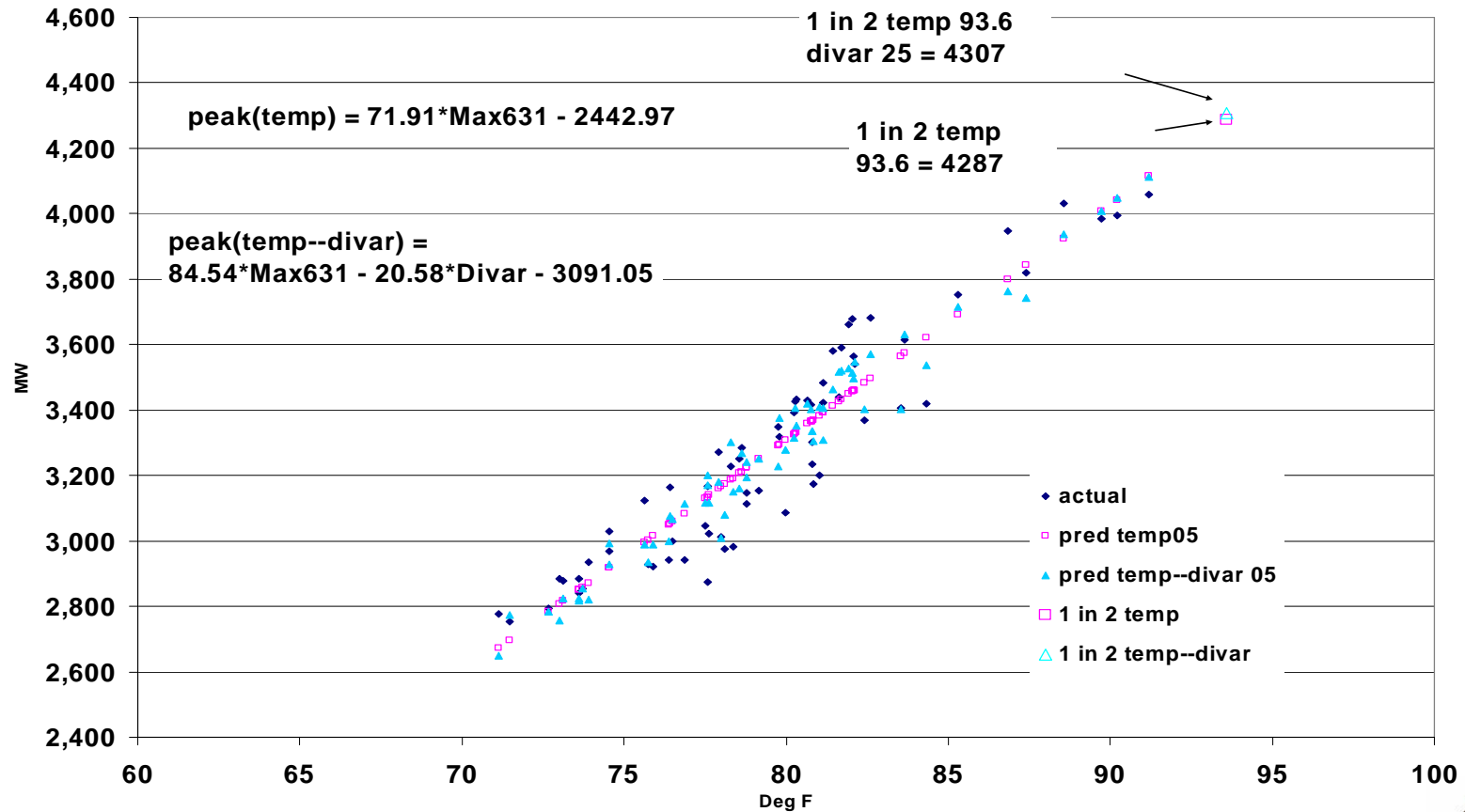
SDG&E Results



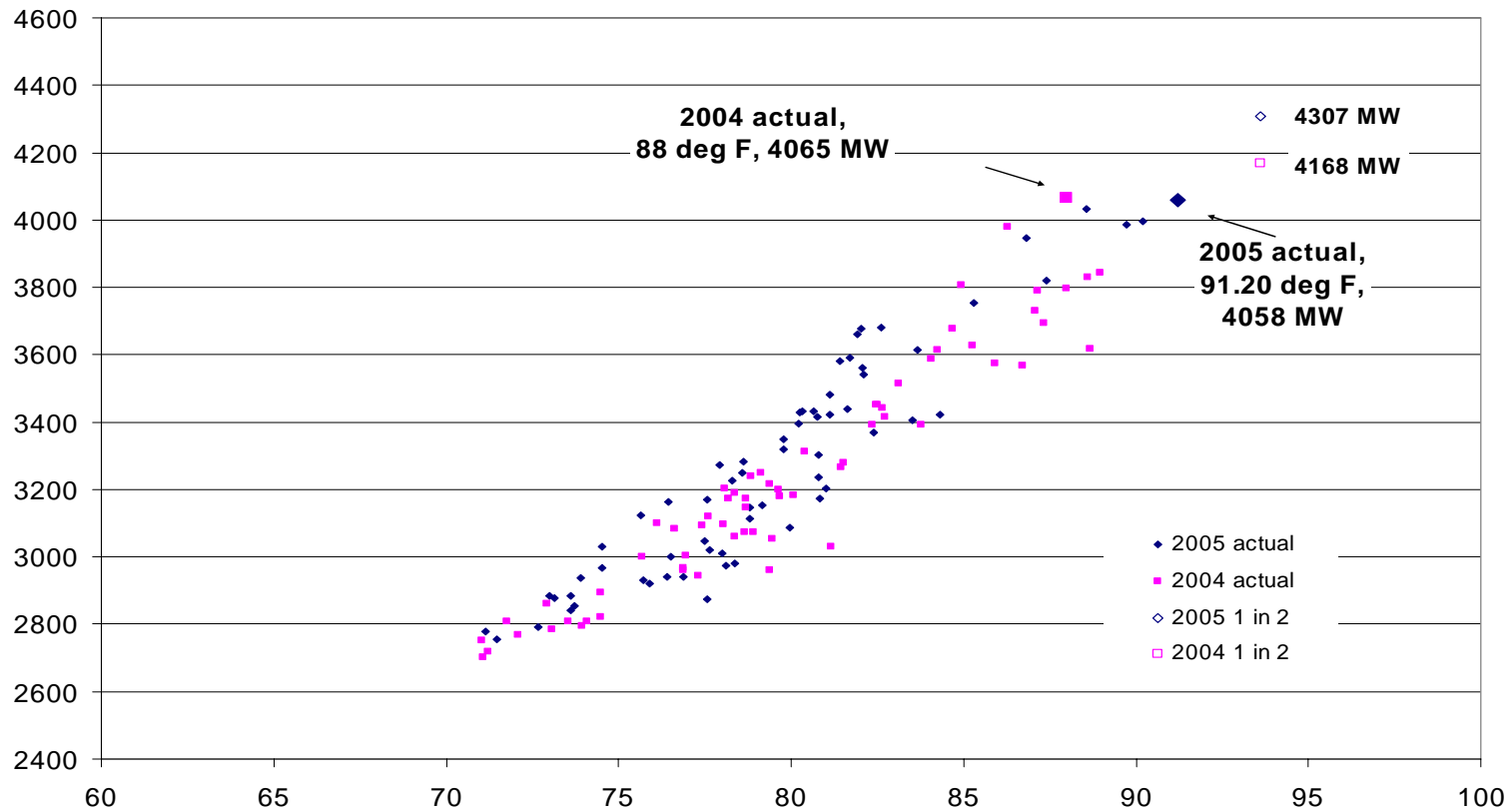
Predicted 2005 SDG&E Summer Weekday Peaks Using Temperature and Temperature w/diurnal variation



SDG&E 2005 Model Results using Alternative Weather Variables



SDG&E 2004 – 2005 Summer Weekday Temperature – Peak Comparison



Weather adjusted 2004/2005 peak load growth was 3.3 %
Note: Model results include diurnal variations for a given temperature



Possible Causes of Underprediction

- Underestimation of Central A/C Saturations compared to new residential survey results
- Increased Res. A/C operation at peak hours?

Annual Electricity Used by Central Air (gWh)

	Sept. 2005 Forecast	2004 RASS Saturations	Percent Change
PG&E	1973	2789	41.3%
SMUD	403	469	16.3%
SCE	1791	2247	25.4%
SDG&E	232	335	44.5%

